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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/762,097 | 01/20/2004 | Berthold Hahn | P2001,0520 | 4556 |
| 24131 | 7590 | 11/02/2005 | EXAMINER | |
| LERNER AND GREENBERG, PA P O BOX 2480 HOLLYWOOD, FL 33022-2480 | | | TRINH, MICHAEL MANH | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2822 | |

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

E1

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|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/762,097 | Applicant(s) HAHN ET AL. | |
| | Examiner Michael Trinh | Art Unit 2822 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 18-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>1/20/04</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

*** This office action is in response to Applicant's election filed on filing of the application on August 18, 2005. Claims 1-33 are pending, in which claims 18-33 are non-elected.

Election/Restrictions

1. Claims 18-33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was implicitly made, and treated, without traverse in Paper mail date August 18, 2005.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1,3-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawaguchi et al (Article title "The formation of crystalline defects...", 1998, pp 24-26).

Kawaguchi teaches (at pages 24-28) a method for forming a light-emitting device (page 24, last 7 lines) comprising at least the steps of: forming at least one compound semiconductor layer based on gallium nitride and being an active layer or a part of an active layer sequence (page 24, last 7 lines, pages 25,27); and setting growth parameters used during production of the compound semiconductor layer such that, at least in some cases in a vicinity of dislocations in the compound semiconductor layer, regions are produced in the compound semiconductor thickness than remaining regions of the layer having a lower compound semiconductor layer (Fig 4, page 28). Re claim 3, the regions are formed with the lower thickness to be less than half as thick as the remaining regions of the compound semiconductor layer (as shown in Figure 4b; page 28). Re claim 4, wherein the compound semiconductor layer is formed from an $\text{In}_x\text{Al}_y\text{Ga}_{1-x-y}\text{N}$ compound semiconductor, where $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x+y \leq 1$ (page

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24, last 7 lines; Abstract; page 25). Re claim 5, wherein AlGa_xN is provided when $x=0$ in the In_xAl_yGa_{1-x-y}N. (page 24, last 7, lines)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 2,6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawaguchi et al (Article title "The formation of crystalline defects...", 1998, pp 24-26) taken with Applicant's admitted prior art (present specification page 1-3).

Kawaguchi teaches (at pages 24-28) a method for forming a light-emitting device as applied to claims 1,3-5 above. Re claim 12, wherein the substrate includes sapphire (page 25, left column, lines 14-20).

Re claim 2, Kawaguchi teaches forming a light emitting device (LED), but lacks detailing about forming a first coating layer and second coating layer as in claim 2. Re claims 7-8, the first and second coating layer including Ga_uAl_{1-u}N. Re claim 9, MOCVD for depositing the coating layers. Re claim 10, including a buffer layer on the substrate. Re claim 11, the buffer layer include Ga_mAl_{1-m}N.

However, re claim 2, Applicant's admitted prior art teaches (at specification page 2, line 6 through page 3) forming a first coating layer formed from a compound semiconductor based on gallium nitride of a first conductivity type on the substrate; forming the compound

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semiconductor layer, as a light-emitting layer, over the first coating layer; and forming a second coating layer formed from a compound semiconductor based on gallium nitride of a second conductivity type over the light-emitting layer, a composition of the compound semiconductor layer based on gallium nitride differing from a composition of the compound semiconductor of the first and second coating layers (present specification page 2, lines 6-26); wherein, re claims 7-8, the first and second coating layer include AlGa_N layer (present specification page 2, lines 20-25); wherein, re claim 9, MOCVD is used for depositing the coating layers; and wherein, re claims 10-11, a buffer layer of Ga_N ($m=1$) is formed on the substrate, and wherein the first coating layer is formed on the buffer layer (present specification page 2, lines 20-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the light emitting device of Kawaguchi by forming a first coating layer and a second coating layers of AlGa_N layer with a buffer layer on the substrate as taught by Applicant's admitted prior art. This is because of the desirability to form a high power structure blue and violet light emitting diode device.

Re claim 6, Kawaguchi does not detail about doping with foreign substance.

However, Applicants' admitted prior art also teaches (at present specification page 3, lines 22-25) doping the light-emitting layer with a p-type foreign substance and/or an n-type foreign substance to improve the luminance.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to the light emitting device of Kawaguchi by doping the light-emitting layer with a p-type foreign substance and/or an n-type foreign substance as taught by Applicant's admitted prior art. This is because of the desirability to improve the luminance of the light emitting device.

6. Claims 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawaguchi et al (Article title "The formation of crystalline defects...", 1998, pp 24-26) taken with Mukai (Article title "InGa_N-Based Blue Light Emitting Diodes..." L839-841).

Kawaguchi teaches (at pages 24-28) a method for forming a light-emitting device as applied to claims 1,3-5 above.

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Re claims 13-17, Kawaguchi teaches forming an active layer, but lacks mentioning, re claim 13, the active layer sequence with a quantum film structure, re claim 14, including at least one GaN quantum film; re claim 15, as an InGaN/GaN quantum film structure; re claim 16, with at least one undoped GaN quantum film; and re claim 17, with a GaN quantum film or with an intrinsic GaN quantum film.

However, Mukai teaches (at Figure 1; page L839) forming a light emitting diodes including an active layer sequence with a quantum film (single quantum well, SQW, re claim 13), wherein the quantum film includes at least one GaN quantum film (re claim 15), wherein the quantum film structure includes an InGaN/GaN (Figure 1; re claim 16); wherein the quantum film includes at least one undoped GaN quantum film (Figure 1, re claim 17); and wherein the quantum film includes a GaN quantum film as an intrinsic GaN quantum film (Figure 1, re claim 18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to the light emitting device of Kawaguchi by forming the active layer sequence with the single quantum film as taught by Mukai above. This is because of the desirability to form a highly efficient blue/green InGaN singly quantum well structure light emitting diodes (LED).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-18



Michael Trinh
Primary Examiner